

REMARKS

The above remarks are presented in response to the Office Action of April 10, 2003. Claim 13 has been amended as suggested by the Examiner. Claims 1-25 remain for consideration upon entering the present amendment. No new matter has been entered. Reconsideration is respectfully requested in view of the accompanying remarks.

CLAIM SUGGESTIONS

The Examiner alleges that the clarity of claim 13 could be improved by adding the word --system-- after "stack" in line 1 in order to match the preamble of parent claim 14. Accordingly, claim 13 has been amended as suggested, but not required, by the Examiner.

CLAIM REJECTIONS -35 USC §103

Claims 1, 2, 10-14, 17, and 21-25 stand rejected under 35 U.S.C. §103(a) as being unpatentable over JP 8-268750 in view of Lessing et al. (U.S. Pat. No. 5,641,585). Applicant respectfully traverses.

For an obviousness rejection to be proper, the Examiner must meet the burden of establishing that all elements of the invention are disclosed in the prior art; that the prior art relied upon, coupled with knowledge generally available in the art at the time of the invention, must contain some suggestion or incentive that would have motivated the skilled artisan to modify a reference or combined references; and that the proposed modification of the prior art must have had a reasonable expectation of success, determined from the vantage point of the skilled artisan at the time the invention was made. *In re Fine*, 5 U.S.P.Q.2d 1596, 1598 (Fed. Cir. 1988); *In Re Wilson*, 165 U.S.P.Q. 494, 496 (C.C.P.A. 1970); *Amgen v. Chugai Pharmaceuticals Co.*, 927 U.S.P.Q.2d, 1016, 1023 (Fed. Cir. 1996).

Further, even assuming that all elements of an invention are disclosed in the prior art, an Examiner cannot establish obviousness by locating references that describe various aspects of a patent applicant's invention without also providing evidence of the motivating force which would have impelled one skilled in the art to do what the patent applicant has done. *Ex parte*

Levengood, 28 U.S.P.Q. 1300 (Bd. Pat. App. Int. 1993). The references, when viewed by themselves and not in retrospect, must suggest the invention. *In Re Skoll*, 187 U.S.P.Q. 481 (C.C.P.A. 1975).

Neither Lessing et al. nor the fuel cell art as a whole provide a reason for one of ordinary skill in the art to modify the JP 8-268750 reference in the manner required to meet claims 1, 14 or 17. *In re Laskowski*, 871 F.2d 115, 117, 10 U.S.P.Q.2d 1397, 1398 (Fed. Cir. 1989) ("Although the Commissioner suggests that [the structure in the primary art reference] could readily be modified to form the [claimed] structure, '[t]he mere fact that the prior art could be so modified would not have made the modification obvious unless the prior art suggested the desirability of the modification' ") (citation omitted); *In re Stencel*, 828 F.2d 751, 755, 4 U.S.P.Q.2d 1071, 1073 (Fed. Cir. 1987) (obviousness cannot be established "by combining the teachings of the prior art to produce the claimed invention, absent some teaching or suggestion that the combination be made"). There is no teaching or suggestions to combine elements of the prior art to produce the present invention. The present invention is thus nonobvious.

Applicants further maintain that the Examiner has used an improper standard in arriving at the rejection of the above claims under section 103, based on improper hind sight which fails to consider the totality of applicant's invention and to the totality of the cited references. More specifically the Examiner has used Applicant's disclosure to select portions of the cited references to allegedly arrive at Applicant's invention. In doing so, the Examiner has failed to consider the teachings of the references or Applicant's invention as a whole in contravention of section 103, including the disclosures of the references which teach away from Applicant's invention.

Section 103 sets out the test for obviousness determinations. It states, in pertinent part, that such determinations are to be made by consideration of

... the differences between subject matter sought to be patented and the prior art such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the [pertinent] art.

In making a Section 103 rejection, the Examiner bears the burden of establishing a prima facie case of obviousness. *In re Fine*, 5 U.S.P.Q. 2d 1596, 1598 (Fed. Cir. 1998). The Examiner

"... can satisfy this burden only by showing some objective teaching in the prior art or that

knowledge generally available to one of ordinary skill in art would lead that individual to combine the relevant teachings of the references". *Id.*

In applying Section 103, the U.S. Court of Appeals for the Federal Circuit has consistently held that one must consider both the invention and the prior art "as a whole", not from improper hindsight gained from consideration of the claimed invention. See, *Interconnect Planning Corp. v. Feil*, 227 U.S.P.Q. 543, 551 (Fed. Cir. 1985) and cases cited therein.

According to the *Interconnect* court

[n]ot only must the claimed invention as a whole be evaluated, but so also must the references as a whole, so that their teachings are applied in the context of their significance to a technician at the time - a technician without our knowledge of the solution.

Id. Also critical to this Section 103 analysis is that understanding of "particular results" achieved by the invention. *Id.*

When, as here, the Section 103 rejection was based on selective combination of the prior art references to allegedly render a subsequent invention obvious, "there must be some reason for the combination other than the hind sight gleaned from the invention itself." *Id.* Stated in another way, "[i]t is impermissible to use the claimed invention as an instruction manual or 'template' to piece together the teachings of the prior art so that the claimed invention is rendered obvious." *In re Fritch* 23 U.S.P.Q.2d 1780, 1784 (Fed. Cir. 1992).

A statement that modifications of the prior art to meet the claimed invention would have been " 'well within the ordinary skill of the art at the time the claimed invention was made' " because the references relied upon teach that all aspects of the claimed invention were individually known in the art is not sufficient to establish a *prima facie* case of obviousness without some objective reason to combine the teachings of the references. *Ex parte Levengood*, 28 USPQ2d 1300 (Bd. Pat. App. & Inter. 1993). See also *In re Kotzab*, 217 F.3d 1365, 1371, 55 USPQ2d 1313, 1318 (Fed. Cir. 2000) (Court reversed obviousness rejection involving technologically simple concept because there was no finding as to the principle or specific understanding within the knowledge of a skilled artisan that would have motivated the skilled artisan to make the claimed invention); *Al-Site Corp. v. VSI Int'l Inc.*, 174 F.3d 1308, 50 USPQ2d 1161 (Fed. Cir. 1999) (The level of skill in the art cannot be relied upon to provide the suggestion to combine references.). (Emphasis added.) MPEP 2143.01

Moreover, it is noted that the mere elimination of a feature with the consequent loss of its function is generally considered within the level of ordinary skill in the art. However, it should be noted that **the omission of an element and retention of its function is an indicia of unobviousness.** (Emphasis added.) *In re Edge*, 359 F.2d 896, 149 USPQ 556 (CCPA 1966).

More specifically, the Examiner correctly states that the JP reference teaches that the conductive material is used as a heater element of a fuel cell, the reference does not expressly teach that the *interconnects* of the fuel cells are used to heat the fuel cells, as recited in claim 17. The Examiner further correctly states that the reference does not teach that electrical supply connectors or a power supply are electrically connected to the interconnects, as recited in claims 1, 14, and 17.

However, the Examiner adds that the patent of Lessing et al. is directed to a solid oxide fuel cell (see col. 7, lines 40-45) comprising a resistance heating element (78) and its associated electrical connectors, controller (86), and power supply (82) (see Fig. 3; col. 6, lines 5-15).

The Examiner concludes that therefore, the invention as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made because the artisan would be motivated by the disclosure of Lessing et al. to connect the interconnects of the JP '750 reference to electrical connectors, a controller, and a power supply, and to supply electrical current to the interconnects to heat the fuel cell. The Examiner attempts to substantiate this conclusion by alleging that the Lessing et al. disclosure would first motivate the artisan to heat the fuel cell of the JP '750 reference with the interconnects of the JP '750 reference, because the interconnect material is identified as a suitable resistive heating material and that the disclosure of Lessing et al. would additionally motivate the artisan to use the associated elements of Lessing et al. (i.e., electrical connectors, a controller, and a power supply) to heat the interconnects. Applicant respectfully traverses the Examiner's reasoning.

However, the admittedly awkward computer translation of JP 8-268750 teaches "LaCrO₃ suitable as the current collection material or the ceramic heater *elements* of a solid oxide fuel cell, such as a separator, a gas diffuser, and an interchange connector." (Emphasis added.) See paragraph 1 of JP '750 reference. The JP '750 reference discloses two cases where in the first case the conductive ceramics is used as a current collection member, such as an interchange connector of a fuel cell and separator as illustrated in Drawing 1 and where in the second case the conductive ceramics are used as a cylinder-like heater element as described separately and

illustrated separately in Drawing 2. Paragraphs 22 and 23 of the JP '750 reference. Further, with respect to the second case, the JP '750 reference discloses that as a heater element, a monotonous configuration besides the shape of a cylinder of Drawing 2 can be begun, such as a cylinder, spiral and a honeycomb structure. Paragraph 23 of JP '750 reference. There is no teaching or suggestion of configuring the heater element as an interchange connector (i.e., interconnector), as that is taught as a separate element having a separate function (i.e., a current collection member).

Moreover, both Lessing et al. and JP 8-268750 teach separate elements for separate functions (i.e., a heating element and an interconnect) and do not teach or suggest combining the two elements yet retaining both their functions. At best, the JP '750 reference may motivate one skilled in the art to use the resistive heating element of Drawing 2 with the interconnect of Drawing 1 in combination with each other in light of the teachings of Lessing et al. Neither the JP '750 reference nor the Lessing et al. teach or suggest, alone or in combination, elimination of a separate heating element while retaining its function with respect to the interconnect. Both references teach separate elements for separate corresponding functions. The omission of an element and retention of its function is an indicia of unobviousness. *In re Edge*, 359 F.2d 896, 149 USPQ 556 (CCPA 1966).

Thus, neither Lessing et al. nor JP 8-268750 teach or suggest, alone or in combination, at least one interconnect disposed in fluid and thermal communication with at least a portion of said electrochemical cell, said interconnect comprising an electrical supply connector, said interconnect configured to receive electrical energy to act as a heating element to heat said electrochemical cell to a desired temperature, as in claim 1 and similarly claimed in claims 14 and 17. Accordingly, claims 1, 14, and 17, including claims depending therefrom, i.e., claims 2-13, 15, 16, and 18-25, define over JP 8-268750 in view of Lessing et al.

Furthermore, in response to the above argument substantially presented in the previous Office action, the Examiner asserts:

"However, it is submitted that paragraph 1, as well as paragraph 2 of the reference, fairly suggest that the interconnect may be used as a heating element. Paragraph 2 discloses that 'LaCrO₃ The compound expressed is excellent in chemical stability in an elevated temperature, and since electronic-conduction nature is large, the application to the current collection material

or the ceramic heater elements of a solid oxide fuel cell, such as separator, a gas diffuser, and an interchange connector, is considered.' It is submitted that the language used in both paragraph 1 and paragraph 2 fairly suggests that the interconnects or separators may be used as heating elements. It is acknowledged that the language is somewhat awkward and contains grammatical errors as a result of being generated by a computer. Nevertheless, it is believed that the language is sufficiently clear so as to suggest the claimed invention to a skilled artisan without the benefit of hindsight." See pages 7 and 8 of the Detailed Action of Paper No. 4

Applicants respectfully submit that paragraph 1 and 2 fairly suggest a conductive ceramic "(LaCrO₃) suitable as the collection current material or the ceramic heater element of a solid oxide fuel cell cell." (Paragraph [0001]). The conductive ceramic is formed differently depending on whether the conductive ceramic is used for a current collection member, such as an interchange connector and separator or is used for a heater element. This is buttressed in paragraphs [0022] and [0023] where use of the conductive ceramic is distinguished depending on the case in which it is used. More specifically, in the case where the conductive ceramics are used as current collection members, a cermet is formed having a desirable rate of an open pore that is less than 1% and more preferably, less than 0.5%. (See paragraph [0022]). In the case where the conductive ceramics are used a heater element, a sintered compact is formed having a desirable rate of an open pore of less than 20% and more preferably less than 10%. (See paragraph [0023]). There is no teaching or suggestion that the interconnects or separators may be used as heating elements as asserted by the Examiner.

The Examiner further responds to Applicants arguments advanced in response to Paper No. 4 that "[a]pplicants further state that 'neither the JP '750 reference nor the Lessing et al. teach or suggest, alone or in combination, elimination of a separate heating element while retaining its function with respect to the interconnect.' However, it is submitted that the ceramic material of JP '750 is inherently capable of performing both a current collecting function and a heating function. Thus, the interconnect of the JP '750 reference would be inherently capable of heating the fuel cell. Further, as set forth above, the reference teaches in paragraphs 1 and 2 that the heating element of a solid oxide fuel cell may be the interconnect. Accordingly, it is believed that the JP '750 reference teaches the retention of a heating function in its solid oxide fuel cell interconnect." Applicants respectfully traverse.

In order to support an anticipation rejection based on inherency, an Examiner must provide factual and technical grounds establishing that the inherent feature necessarily flows from the teachings of the prior art. *Ex parte Levy*, 17 U.S.P.Q.2d 1461, 1464 (Bd. Pat. App. & Int. 1990); *In re Oelrich*, 666 F.2d 578, 581, 212 U.S.P.Q. 323, 326 (C.C.P.A. 1981) (holding that inherency must flow as a necessary conclusion from the prior art, not simply a possible one). Applicants submit that the Examiner has not made a prima facie case of anticipation of present claims 1, 14, and 17 based on inherency.

The Examiner has not shown technical and factual grounds for establishing that the interconnect of the JP '750 reference would be inherently capable of heating the fuel cell presently claimed. JP '750 discloses a compound having excellent chemical stability at elevated temperatures such that it suppresses expansion and contraction behavior, consequently solving the problem of cracks occurring in previous materials used for fuel cell cells and heater elements (See JP '750 at paragraphs [0002]- [0005]). There is no factual or technical grounds for asserting that the interchange connector and heating element in JP '750 inherently can be combined using the compound taught therein to form a single interconnect functioning as a heating element and interconnect as presently claimed. The disclosure that the material taught in JP '750 is suitable as the material for a collection current member or heating element of a solid oxide fuel cell is not a factual or technical ground for asserting that the JP '750 material possesses the inherent capability of performing both the current collecting function and a heating function with a single element (i.e., interconnect) presently claimed.

JP '750 discloses a conductive ceramic that may be used for a current collection member, such as an interchange connector or a heater element for a fuel cell. In the case where the conductive ceramics are used as current collection members, **a cermet is formed** having a desirable rate of an open pore that is less than 1% and more preferably, less than 0.5%. (See paragraph [0022]). In the case where the conductive ceramics are used a heater element, **a sintered compact is formed** having a desirable rate of an open pore of less than 20% and more preferably less than 10%. (See paragraph [0023]). There are no factual or technical grounds for asserting that the ceramic materials in JP '750 inherently possess the ability to be formed into a single element that acts as both an interconnect and heating element as asserted by the Examiner and presently claimed. The disclosure that the differently formed ceramic materials taught in JP '750 (i.e., cermet and sintered compact with different rates of an open pore for each) possess a

the capability to be combined into a single element performing dual functions of respective individual elements is not a factual or technical ground for asserting that the JP '750 material possesses the capability to be combined into a single element capable of performing functions taught to be performed with respective individual elements.

Claims 6, 15, and 16 stand rejected under 35 U.S.C. §103(a) as being unpatentable over JP 8-268750 in view of Lessing et al. as applied to claims 1, 2, 10-14, and 21-25, and further in view of JP 61-045569. Applicant respectfully traverses.

Claim 6 depends from claim 1 while claims 15 and 16 depend from claim 14, which are respectfully submitted as being allowable for defining over JP 8-268750 in view of Lessing et al. as discussed above. Further, it is respectfully noted that the use of a switch and a battery of the JP '569 reference does not cure the deficiencies noted above in JP 8-268750 and Lessing et al.

Claims 3-5 and 18-20 stand rejected under 35 U.S.C. §103(a) as being unpatentable over JP 8-268750 in view of Lessing et al. as applied to claims 1, 2, 10-14, 17, and 21-25, and further in view of Haltiner, Jr. et al. (U.S. Pre-Grant Publication No. 2002/0004155) and Claar et al. (U.S. Patent No. 4,883,497). Applicant respectfully traverses.

Claims 3-5 depend from claim 1 while claims 18-20 depend from claim 17, which are respectfully submitted as being allowable for defining over JP 8-268750 in view of Lessing et al. as discussed above. Further, it is respectfully noted that the use of a thinner interconnect less than 1 mm, as recited in claims 3-5 and 18-20 allegedly disclosed in Haltiner, Jr. et al. and Claar et al. do not cure the deficiencies noted above in JP 8-268750 and Lessing et al.

Claims 7-9 stand rejected under 35 U.S.C. §103(a) as being unpatentable over JP 8-268750 in view of Lessing et al., Haltiner, Jr. et al. and Claar et al. as applied to claims 3-5 and 18-20, and further in view of Fishbane et al. (Physics for Scientists and Engineers, vol. II). Applicant respectfully traverses.

Claims 7-9 depend from claim 1, which is respectfully submitted as being allowable for defining over JP 8-268750 in view of Lessing et al. as discussed above. Further, it is respectfully noted that the use of a higher ohmic heating value (greater than 1.2 ohms) allegedly disclosed in Fishbane et al. does not cure the deficiencies noted above in JP 8-268750 and Lessing et al.

CONCLUSION


In view of the above-presented amendments and accompanying remarks, it is respectfully submitted that all of the pending claims, Claims 1-25 are patentable over the prior art and allowance is respectfully requested.

If, however, any issues remain, the Examiner is cordially invited to contact the undersigned so that such issues may be promptly resolved.

In the event any further fees are due with respect to this amendment or otherwise, please charge them to Deposit Account No. 06-1130, maintained Applicants' Attorneys.

Respectfully submitted,

CANTOR COLBURN LLP

By: 
James J. Merrick
Registration No. 43,801

CANTOR COLBURN LLP
55 Griffin Road South
Bloomfield, CT 06002
Telephone (860) 286-2929
Facsimile (860) 286-0115
Customer No. 22851

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